



Technology Opportunity

Quick-Connect, Slow-Disconnect Bolt

The National Aeronautics and Space Administration (NASA) seeks to transfer the NASA-developed Quick-Connect, Slow-Disconnect Bolt technology to private industry for use in commercial applications. This device was developed at the George C. Marshall Space Flight Center to provide a means of easily assembling components in the weightless environment of space. The bolt functions by pushing it through a standard threaded hole as far as possible causing the externally threaded shells to engage with the threads in the hole. Once engaged, the only way the bolt can be tightened or withdrawn is by turning it the conventional manner, clockwise or counterclockwise respectively.

Potential Commercial Uses

- ◆ Emergency management (fire & rescue, disaster relief support)
- ◆ Auto manufacturers
- ◆ Industrial machinery & assembly
- ◆ Underwater salvage and construction
- ◆ Military

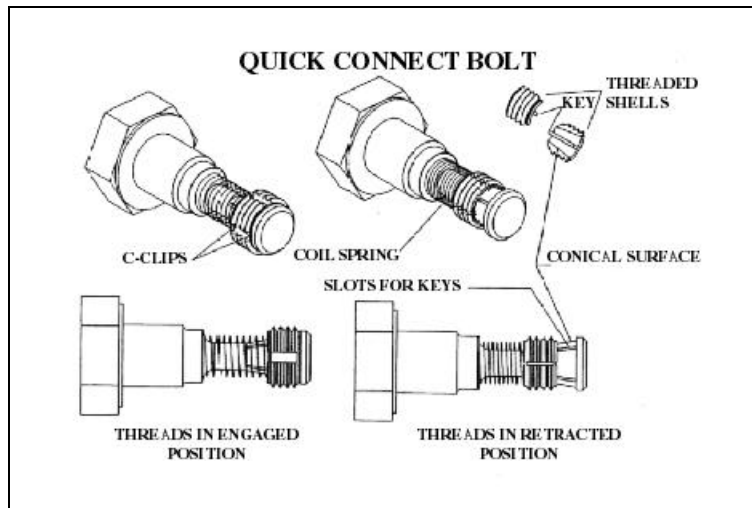
Attributes

- ◆ Portable as conventional bolts
- ◆ Easy to store
- ◆ Unlimited shelf life
- ◆ Can be used in the same conditions as conventional bolts
- ◆ Advantageous in situations where speed is important
- ◆ Strong as conventional bolts and virtually fail safe

The Technology

The Quick-Connect, Slow-Disconnect Bolt consists of a head on one end, a cylindrical shank of the basic bolt diameter, and a threaded end. The unique attribute of the invention is the configuration and function of the threaded end. The threads of the bolt are made onto several shells, which have a conical inner surface, with a raised key protruding radially inward running parallel to the axis of the bolt. The shells have a standard thread profile on their cylindrical outer surface and a groove for retaining a spring clip at each end. A C-shaped spring clip wraps around all the shells at each end, retaining them to the conical surface of the end of the bolt. The clips are pre-loaded to squeeze the shells radially inward, down and back along the conical surface of the bolt. A coil spring mounted between the shank of the bolt and the back surface of the shells is pre-loaded to force the shells towards the end of the bolt. Movement of the shells past the end of the bolt is prevented by a larger diameter cylindrical stop at the end of the bolt. The coil spring pre-load overcomes the opposing force of the C-clips and holds the shells against the stop at the end of the bolt.

When the invention is pushed into a threaded hole, the threads of the hole contact the first thread of the shells and drive the shells back, away from the end of the bolt, compressing the coil spring. As the shells move rearward along the conical surface of the bolt end, the force of the C-clips urges them radially inward. This reduces the outside diameter of the shells to less than the minor diameter of the hole threads, allowing the shells to slip past the internal threads. Once the shells have slid past the first hole threads, the threads of the shells will be forced towards the end of the bolt by the coil spring. The shells are forced radially outward and into engagement with the hole threads by the conical surface of the bolt.



Options for Commercialization

This technology opportunity is part of the NASA Technology Transfer Program. The program seeks to stimulate development of commercial applications from NASA-developed technology. The Quick-Connect, Slow-Disconnect Bolt has been developed, built, and used at MSFC. U.S. patent #5,634,754 has been issued for this device. NASA seeks qualified companies to license and commercialize this technology.

Contact

If your company is interested in commercializing the Quick-Connect, Slow-Disconnect Bolt or if you need additional information, please reference case no. MFS-28829 and contact:

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